[epjjsvjour
graphics

document Electromagnetic structure of the deuteron review of recent theoretical and experimental results Franz Gross Jefferson Laboratory, 12000 Jefferson Avenue, Newport News, VA 23606; gross@jlab.org Received: September 13,2002 Recent high energy measurements of elastic ed scattering support the use of a relativistic theory based on an accurate description of the NN channel, but theory needed for an understanding of the high energy deuteron photodisintegration cross sections and polarization observables is not yet mature. 25.30.B, 25.30.D, Felastic and inelastic electron scattering 24.10.JRelativistic models (nuclear reactions) *-3.5in JLAB-THY-02-43
*3.5in

Introduction intro This talk reviews recent theoretical and experimental results for elastic electron deuteron scattering (yielding the deuteron form factors), threshold electrodisintegration ($e + d \to e' + p + n$ where the mass of the final np pair, W, is only a few MeV above the threshold value of $m_p + m_n$), and high energy deuteron photodisintegration ($\gamma + d \to p + n$). The talk is based on the complete reviews of Refs. GVO,S,GG, with a few new results not previously reported.

Deuteron Wave Functions

The deuteron wave functions are calculated from a potential (or a relativistic kernel) that has been fitted to NN scattering data below lab kinetic energies of 350 MeV. Figs. fig:1,fig:2, and fig:3 show the coordinate and momentum space wave functions for six models: Argonne AV18 AV18, Paris Paris, CD Bonn CDBonn, IIB gvoh92, W16 sg97 and the recent Idaho potential Idaho. These figures are modified versions of those in Ref. GG; the principle change is the inclusion of the new Idaho wave functions (the heavy dashed-triple dotted line) which have a rapid but smooth cutoff above 600 MeV momentum. This cutoff explains the ripples in the r space wave functions, and will have a profound effect on the deuteron form factors.

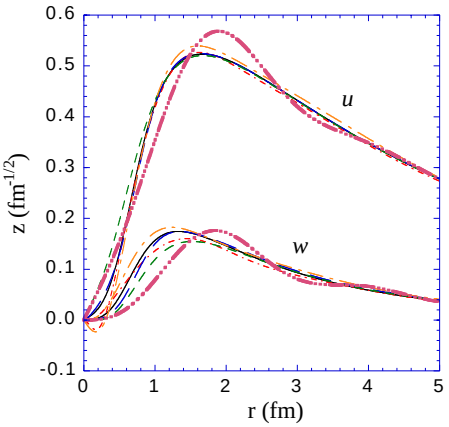

figure center